

FORM PTO-1390  
(REV. 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

259/280

U.S. APPLICATION NO. (If known, see 37 CFR 1.5

(Not Assigned) 09/762837

INTERNATIONAL APPLICATION NO.

PCT/DE99/02567

INTERNATIONAL FILING DATE

August 16, 1999

PRIORITY DATE CLAIMED

August 31, 1998

TITLE OF INVENTION

SYSTEM FOR ENABLING A MOVING PERSON TO CONTROL BODY MOVEMENTS TO BE  
PERFORMED BY SAID PERSON

APPLICANT(S) FOR DO/EO/US

SIEMENS AKTIENGESELLSCHAFT

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ has been communicated by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
  - a. ☒ is attached hereto.
  - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ have been communicated by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☐ Other items or information:

U.S. APPLICATION NO. (If known, see 37 CFR 1.51) (Not yet assigned) <b>09/762837</b>		INTERNATIONAL APPLICATION NO <b>PCT/DE99/02567</b>		ATTORNEY'S DOCKET NUMBER <b>259/280</b>	
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21. ☒ The following fees are submitted:

**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):**

Neither international preliminary examination fee (37 CFR 1.482)  
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO  
and International Search Report not prepared by the EPO or JPO..... **\$1000.00**

International preliminary examination fee (37 CFR 1.482) not paid to  
USPTO but International Search Report prepared by the EPO or JPO ..... **\$860.00**

International preliminary examination fee (37 CFR 1.482) not paid to USPTO  
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... **\$710.00**

International preliminary examination fee (37 CFR 1.482) paid to USPTO  
but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... **\$690.00**

International preliminary examination fee (37 CFR 1.482) paid to USPTO  
and all claims satisfied provisions of PCT Article 33(1)-(4) ..... **\$100.00**

**ENTER APPROPRIATE BASIC FEE AMOUNT =**

**CALCULATIONS PTO USE ONLY**

Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
<b>CLAIMS</b>	<b>NUMBER FILED</b>	<b>NUMBER EXTRA</b>	<b>RATE</b>	\$	
Total claims	15 - 20 =	0	x <b>\$18.00</b>	\$	
Independent claims	1 - 3 =	0	x <b>\$80.00</b>	\$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				\$	
				+ <b>\$270.00</b>	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$	860.00
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$	
<b>SUBTOTAL =</b>				\$	860.00
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
<b>TOTAL NATIONAL FEE =</b>				\$	860.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property +				\$	40.00
<b>TOTAL FEES ENCLOSED =</b>				\$	900.00
				Amount to be refunded:	\$
				charged:	\$

a. ☒ A check in the amount of \$ 900.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the above fees.  
A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 12-2475. A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

**Lyon & Lyon LLP**  
633 West Fifth Street, Suite 4700  
Los Angeles, CA 90071-2066  
(213) 489-1600  
PTO Customer No. 22249

SIGNATURE

**Rouget F. Henschel**

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NAME

**39,221**

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REGISTRATION NUMBER.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of:	)	
	)	Group Art Unit: (Not yet assigned)
BIRKHÖLZER, et al.	)	
	)	Examiner: (Not yet assigned)
Serial No.: (Not yet assigned)	)	
Filed: Herewith	)	
	)	
Based on International Application No.	)	
<b>PCT/DE99/02567</b> , filed on August 16, 1999	)	
	)	
For: SYSTEM FOR ENABLING A MOVING	)	
PERSON TO CONTROL BODY	)	
MOVEMENTS TO BE PERFORMED BY	)	
SAID PERSON	)	

**PRELIMINARY AMENDMENT**

Box PCT  
Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please enter the following amendments in the above-referenced application.

**IN THE CLAIMS**

Please cancel claims 1-12, without prejudice or disclaimer.

Please add the following new claims:

13. (New) A system for self-monitoring by a moving person of body movements, comprising:
  - a) a video camera configured to generate a recorded video image or image sequence;
  - b) a monitor operatively coupled to the video camera for outputting the recorded video image or image sequence; and

c) an insertion component configured to insert at least one moving marker, indicating a predetermined movement or body position, into the video image or image sequence, wherein the insertion component is configured to detect characteristic points, lines, contours, or equivalent characteristics of the moving person or of a displayed area of the moving person, wherein the moving person is performing a body movement sequence and is shown in the recorded video image sequence, and wherein the insertion component is configured to automatically adapt the movement speed of the moving marker to the movement speed of the moving person or of a displayed area of the moving person.

14. (New) A system as claimed in claim 13, wherein the insertion component is configured for inserting at least one stationary marker that is stationary during the body movement and indicates a predetermined, ideal body movement.

15. (New) A system as claimed in claim 14, wherein the insertion component is configured for inserting at least one stationary marker suitable for adjustment of the person with respect to the video camera.

16. (New) A system as claimed in claim 13, wherein the insertion component is configured:

- a) to detect characteristic points, lines, contours, or equivalent characteristics of the person shown in the recorded video image, or of the displayed area of the person, while the person is not moving; and
- b) to automatically adapt the marker in a manner dependent on a detection result.

17. (New) A system as claimed in claim 16, wherein the insertion component is configured to automatically adapt a size and/or insertion position of the marker in a manner dependent on the detection result.

18. (New) A system as claimed in claim 13, wherein the insertion component is configured:

- a) to detect characteristic points, lines, contours, or equivalent characteristics of the person shown in the recorded video image or image sequence, or of the displayed area of the person, while the person is performing a movement sequence and is shown in the recorded video image sequence; and
- b) to automatically adapt the marker in a manner dependent on a detection result.

19. (New) A system as claimed in claim 18, wherein the insertion component is configured to automatically adapt a size and/or insertion position of the marker in a manner dependent on the detection result.

20. (New) A system as claimed in claim 13, wherein the system is configured for manually varying size and/or insertion position and/or movement speed of the marker.

21. (New) A system as claimed in claim 13, further comprising a storage component operatively coupled to the insertion component, wherein for a plurality of different predetermined body movement sequences, insertion data is stored for at least one marker, and the person may select from among the stored insertion data.

22. (New) A system as claimed in claim 13, wherein the moving marker comprises one or more point(s) and/or line(s).

23. (New) A system as claimed in claim 22, wherein the one or more point(s) and/or line(s) form a stylized person or an equivalent thereof.

24. (New) A system as claimed in claim 23, wherein the system is configured for allowing the user to select from among different display forms.

25. (New) A system as claimed in claim 13, wherein the insertion component is integrated in the video camera.

26. (New) A system as claimed in claim 13, wherein the insertion component is integrated in the monitor.

27. (New) A system as claimed in claim 13, wherein the insertion component comprises a separate component within a communications channel between the video camera and the monitor.

**REMARKS**

Claims 1-12 have been revised to conform to standard U.S. practice and have been replaced by claims 13-27. The amendment thus would create no estoppel and would not limit applicability of the doctrine of equivalents.

No new matter has been added.

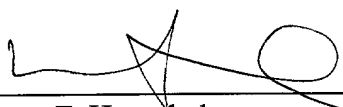
Applicants submit that the application is now in condition for examination on the merits. If the Office has questions, Applicants invite the Office to call the undersigned at (202) 974-6018.

The Commissioner is authorized to charge Deposit Account No. 12-2475 for any fee deficiency.

Respectfully submitted,

LYON & LYON LLP

Dated: 2/13/01

By:   
Rouget F. Henschel  
Reg. No. 39,221

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# Description

System for enabling self-monitoring, with regard to  
body movement sequences to be carried out, by the  
5 moving person

The invention relates to a system for enabling  
self-monitoring, with regard to body movement sequences  
to be carried out, by the moving person.

10 Practising specific movements or movement  
sequences plays an important part for example in the  
context of rehabilitation. In this case, the subject or  
patient practises specific movement sequences in order  
to train his/her overall body mobility or,  
15 alternatively, in order, for example, to influence  
specific body parts or muscle groups in a targeted  
manner. However, the targeted practising of specific  
movement sequences is also an important therapeutic  
element for physically disabled persons. When  
20 practising these movement sequences or when carrying  
out the training exercises, it is often crucial that  
the movements be performed "correctly", that is to say  
that a predetermined movement sequence be adhered to in  
the best possible manner. It would be desirable here to  
25 identify deviations as far as possible in the course of  
the movement, in order to be able to correct them  
immediately, thereby avoiding the situation where an  
exercise is repeatedly carried out "incorrectly", which  
cannot lead to the therapeutic success sought. On the  
30 contrary, in this case there is even the risk that, on  
account of the "incorrect" movement sequence, there  
will be no improvement at all, or even a deterioration.

Self-perception of a subject's own movements is  
often insufficient for adequate monitoring, since self-  
35 perception can be disturbed, for example on account of  
specific disturbances to the subject's health, it is,

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furthermore, often not possible to visually observe the  
movements (rear view, side view). Finally, when

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carrying out a complex, dynamic procedure, self-perception may be overtaxed, in other words the patient cannot simultaneously concentrate both on correctly carrying out the complex movement sequence and on  
5 detecting any movement errors. In order to remedy this, it would be possible to enlist an external observer, that is to say a trainer or therapist, but this involves effort and is very expensive. Furthermore, it is possible to utilise mirrors and the like for  
10 continuous self-observation. The disadvantage in this case is that, in spite of everything, the actual ideal body position or the ideal movement sequence cannot be identified, in other words adequate monitoring cannot be achieved by this means either. Finally, there also  
15 remains the possibility of capturing the movement sequence by means of a video recording and subsequently observing and analyzing it. However, self-monitoring during the movement is not possible in this case either.

20 EP 0 700 694 A1 discloses a training and diagnosis method in which the person who is training has to carry out a movement using a training device, a measurement recording being used to detect the movement and display it in the form of a curve representing the  
25 movement course on a monitor. With respect to this curve it is possible to insert a predetermined curve to be reconstructed by the person who is training.

WO 98/28053 describes a device for carrying out interactive movement training in which optimum movement  
30 sequences are stored in a memory. While the exercises are being carried out, a video camera captures an image of the person who is training, said image being superposed on the stored video sequences. The person who is exercising simultaneously sees himself and the  
35 optimum movement sequence on a monitor and can compensate for any deviations. What is disadvantageous here, however, is that the person who is training has

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to adapt the speed at which he performs an exercise to  
the speed

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at which the video sequence is reproduced. This reproduction speed is adjustable, however.

US 3 408 750 describes an apparatus in which the position of a golf player is recorded by a video camera, a video recording of an optimum movement sequence simultaneously being displayed on a monitor. There is, however, no interactivity between the recorded movement and the real movement. A system for the insertion of an optimum trajectory in a game of basketball by a laser beam is disclosed in US 5 365 427. However, the targeted training and monitoring of individual movement sequences is not possible in this way.

The invention is thus based on the problem of specifying a system of the type mentioned in the introduction which avoids the disadvantages mentioned.

In order to solve this problem, a system of the type mentioned in the introduction is provided, according to the invention comprising a video camera and a monitor for outputting the recorded video image, and also a means for inserting at least one moving marker, indicating a predetermined movement or body position, into the video image, the insertion means being designed for detecting characteristic points, lines, contours or the like of the person who is performing a movement sequence and is shown in a recorded video image sequence, or of the person's area shown, and for automatically adapting the movement speed of the moving marker to the movement speed of the moving person, or of the person's area.

On the one hand, the system according to the invention utilises the possibility whereby images that have been captured by means of the video camera can be reproduced "live" on the monitor, so that the person can follow the movement sequence directly on the screen. The

to insert into the live image supplied by the video camera one or more markers indicating the ideal body position with regard to the movement sequence predetermined by the therapist for example. The patient  
5 is thus continuously shown the desired position with regard to the previously known movement sequence, which he can immediately compare with the current actual position in which he is in and which he can see from the live video image. The subject can thus identify  
10 deviations from the desired position indicated by means of the markers, and can immediately correct them. This enables the subject to identify and perform the "correct" movement, so that the therapeutic success to be attained by the movement training can actually be  
15 achieved. As the marker, it is possible to insert, by way of example, a point or alternatively, of course, a plurality of points, assigned, for example, to different body extremities, but also one or a plurality of lines, in particular in the form of a stylized  
20 person ("matchstick man"), or, alternatively, in the form of contour lines or the like. The user can also choose between these as desired, depending on which display form he personally prefers for self-monitoring. The movements to be carried out and the position of the  
25 markers are stipulated by the trainer or therapist according to e.g. medical standpoints.

The insertion means is designed for inserting a moving marker indicating a predetermined, ideal body movement. The marker moves in parallel with and at the  
30 same time as the body, in other words the subject is shown the ideal desired position at every instant, which he can compare with the actual position in accordance with his own video image. This is expedient when it is important not only to attain a specific body  
35 position, as in the case described above, but also for the body movement to follow an ideal movement line or direction.

If the speed of the movement is not important in specific movement sequences, for example in the case of power training, according to the invention the insertion means designed for detecting characteristic points, lines, contours or the like of the person who is performing a movement sequence and is shown in a recorded video image sequence, or of the person's area shown, can be designed for automatically adapting the movement speed of a moving marker to the movement speed of the moving person or of the person's area.

The means for inserting the marker can, according to the invention, be directly integrated in the video camera. In video cameras, the insertion of graphic elements, e.g. in the form of an overlay, into the video image is a known standard function with which e.g. the time or a date can be inserted as text into the video film. The means, a graphics processor, which is integrated, according to the invention, in the video camera merely has to be configured or programmed in accordance with the marker to be inserted in the case of the system according to the invention. As an alternative to this, it is also possible, of course, to integrate the means, that is to say the graphics processor, directly in the monitor or, alternatively, to use an interposed insertion means, for example in the form of a personal computer, which is arranged in the communications connection between the video camera and the monitor (e.g. a communications line).

According to the invention, the insertion means can also be designed for inserting a marker which is stationary during the body movement. In other words, in the case of this invention alternative, during the body movement in which, by way of example, the right arm and the right leg are to be simultaneously swung into a specific position, the ideal end positions to be taken up respectively by the arm and leg are indicated. In this case, the subject recognizes whether he is now

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actually swinging his arm or his leg to an extent such  
that he is attaining the therapeutically

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ideal desired position, or whether his swing is too short or far, for example.

As described, the marker or markers serves or serve for indicating an ideal desired body position. In other words, the position or size and the like of the marker must be adapted and related to the position and the size, etc. of the person shown in the video image. The "position and size" of the person shown in the image depends, on the one hand, on the size of the person himself/herself and, on the other hand, on the setting of the video camera or the distance thereof from the person. Moreover on whether, by way of example, only a specific body area is to be displayed, for example only a leg which is to be moved in a targeted manner, and which is then moved into the video image using a zoom device of the video camera.

To provide a simple possibility ensuring that the person is correctly positioned with respect to the video camera, in order that, with respect to the person shown in the video image, the markers are inserted at the correct location based on the size of the person shown in the image, according to the invention it is possible to insert one or more markers which serve as adjustment markers and, by way of example, specify where the top of the head and where the feet and the like must be positioned in the video image. The person who is training then merely has to choose his position with respect to the video cameras such that his head and feet and the like are congruent with the adjustment markers inserted into the video image. In addition to these markers serving for adjustment, the further markers indicating the movement or body position to be attained are then inserted. In this case, the person who is training must maintain a fixed position with respect to the video camera.

In order to enable simple adaptation and correlation, according to the invention the insertion

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means can be designed for detecting characteristic points, lines, contours or the like of the

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non-moving person shown in the recorded video image, or of the person's area shown, and for automatically adapting the marker, in particular the latter's size and/or insertion position, in a manner dependent on the  
5 detection result. The insertion means is thus able to use the video image to detect the relevant information with regard to the person shown or the person's area, so that, using appropriate processing technology, the  
10 "matchstick man", can then be related to the size of the detected person. This is expediently done when the person is not moving, since it is then a simple matter to detect said person's characteristic points.

As an alternative to this, it is possible for  
15 the insertion means to be designed for detecting characteristic points, lines, contours or the like of the person who is performing a movement sequence and is shown in a recorded video image sequence, or of the person's area shown, and for automatically adapting the  
20 marker, in particular the latter's size and/or insertion position, in a manner dependent on the detection result. In this configuration of the invention, therefore, firstly a complete movement sequence is recorded by means of the video camera. This  
25 can be done under supervision, for example, so that the subject performs the movement in the best possible way. In this case, it is then possible at the same time to recognize what the subject is currently able to do, so that, if appropriate, in addition to the automatic  
30 adaptation, manual intervention may also be made in the representation sequence of the marker, which may likewise be provided according to the invention. In this way, in the manner of a "teach-in", the ideal movement specification, that is to say the insertion  
35 data of the marker, can thus be generated in accordance with the actual ability of the subject to move, and be specifically geared to said subject. The trainer or therapist can thus generate the specific desired

movement sequence for the respective subject, defined by the marker(s).

If the speed of the movement is not important in specific movement sequences, for example in the case of power training, according to the invention the insertion means designed for detecting characteristic points, lines, contours or the like of the person who is performing a movement sequence and is shown in a recorded video image sequence, or of the person's area shown, can be designed for automatically adapting the movement speed of a moving marker to the movement speed of the moving person or of the person's area.

As described, in addition to automatic adaptation/variation, manual variability of the size and/or of the insertion position and/or of the movement speed of the marker may also be provided.

5           In a further configuration of the invention, the insertion means may be assigned a storage means in which, for a plurality of different predetermined body movement sequences, the respective insertion data of at least one marker are stored and can be selected by the  
10 user as desired. This enables a subject who, in the context of his rehabilitation or training, has to carry out a plurality of different movement sequences to select the marker sequence intended for the respective movement sequence, so that said marker sequence is  
15 displayed.

Further advantages, features and details of the invention emerge from the exemplary embodiment described below and from the drawings, in which:

20 Figure 1 shows a system of a first embodiment,  
  
Figure 2 shows a system of a second embodiment, and  
  
Figure 3 shows a system of a third embodiment.

25           The system according to the invention which is shown therein comprises a video camera 1, which is used to record the movements of a person 2. The video camera 1 is connected via a corresponding data line to a  
30 monitor 3, on which the recorded video image 4 can be output live. As an alternative to the data line, line-free communication is also conceivable. An insertion means 5 is connected between video camera 1 and monitor 3. The insertion means 5 serves for inserting into the  
35 video image 4 shown at least one marker indicating an ideal desired body position which

should ideally be taken up by the person 2 who is carrying out a specific movement sequence. In the example shown, a plurality of markers 6 in the form of points are inserted into the video image 4. These points 6 can be perceived visually by the person 2. In the example shown, the markers 6 are assigned to the various body extremities. Two markers 6 are assigned to the feet, two further markers are assigned to the knees and the last two markers are assigned to the hands.

From the coincidence or non-coincidence of the markers 6 with the respective body parts of the person 2 in the video image 4, the person 2 can recognize whether or not his/her body position corresponds to the desired position predetermined by the markers 6. In the exemplary embodiment shown, the movement is performed correctly insofar as the position and the posture of the left arm correspond to the movement specifications. However, the posture of the right arm 7 deviates from the desired position since the arm 7' shown in the video image 4 is not congruent with the assigned marker 6'. The person 2 can immediately recognize this deviation from the desired position during the movement and then correct it accordingly, so that the subsequent movement sequence can be carried out in a manner approximated even further to the desired position.

Figures 2 and 3 show two system variants in which the insertion means 5 is integrated in the video camera (figure 2), or alternatively in the monitor (figure 3). In each case the means comprises an appropriately designed graphics processor which can be appropriately programmed or insertion of the markers. Furthermore, figure 2 shows stationary markers 6" which are inserted into the video image and serve for adjustment or positioning of the person with respect to the video camera 1. The person changes his/her position with respect to the video camera 1 until e.g. the head and feet of the person in the video image are congruent with the respective markers 6".

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The insertion means 5, as is provided e.g. in  
the systems according to figures 1 and 3, may  
furthermore be able

to detect, within the video image 4, characteristic points, lines or contours of the person shown. From this it is possible to identify the size, position, etc. of the person shown in the video image 4, and to  
5 correspondingly adapt the insertion of the markers 6, since the latter have to be related to the size of the person shown. If the person shown in the video image were, for example, represented only half as large, for example if the video camera 1 were arranged at a  
10 corresponding distance from the person, then if there were no change to the insertion positions of the markers 6 shown in the example, said markers would be inserted completely incorrectly, in other words an actual/desired position comparison would not be  
15 possible in this case. This adaptation can be effected automatically, this expediently being done when the person is not moving.

In addition, instead of (or, if appropriate, in addition to) the automatic adaptation of the marker  
20 position and/or size, it is possible (as described with respect to figure 2) that the insertion means 5 can insert in the video image stationary markers serving for positioning e.g. the head and feet of the person and for adjustment. In that case, the person only has  
25 to position himself/herself relative to the video camera in such a way that the head shown in the video image and the feet are congruent with the respective markers. In this case, the person must maintain this taken-up position during the exercise.

30 Furthermore, the insertion means is designed for inserting stationary markers, which only define ideal end positions of the body, and for inserting markers which move with the person. If it is not important to adhere to a specific movement speed during  
35 the movement sequence that is carried out, the insertion means 5 is furthermore able to adapt the movement speed of the markers 6 in accordance with the

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movement speed of the person. In the case of automatic  
adaptation this adaptation is effected

when the person is moving. In addition, the respective parameters of the marker can also be varied manually in order to be able, as desired, to effect manual correction or adaptation. In addition to the embodiment  
5 of the markers 6 in the form of points which is shown in the example, they can, for example, also be inserted in the form of lines, e.g. in the form of a stylized person ("matchstick man") or the like. Finally, the insertion means 5 may also be assigned an, expediently,  
10 integrated storage means in which the insertion data of the markers for different movement sequences to be carried out by the subject are stored, which can be selected as desired by the subject.



Patent Claims

1. A system for enabling self-monitoring, with regard to body movement sequences to be carried out, by the moving person, comprising a video camera (1) and a monitor (3) for outputting the recorded video image (4), and also a means (5) for inserting at least one moving marker (6), indicating a predetermined movement or body position, into the video image (4), characterized in that the insertion means (5) is designed for detecting characteristic points, lines, contours or the like of the person (2) who is performing a movement sequence and is shown in a recorded video image sequence, or of the person's area shown, and for automatically adapting the movement speed of the moving marker (6) to the movement speed of the moving person (2), or of the person's area.

2. The system as claimed in claim 1, characterized in that the insertion means (5) is also designed for inserting a marker (6) which is stationary during the body movement and indicates a predetermined, ideal body movement.

3. The system as claimed in claim 1 or 2, characterized in that the means is designed for inserting at least one stationary marker (6") serving for adjustment of the person with respect to the video camera (1).

4. The system as claimed in one of the preceding claims, characterized in that the insertion means (5) is designed for detecting characteristic points, lines, contours or the like of the non-moving person (2) shown in the recorded video image (4), or of the person's area shown, and for automatically adapting the marker (6),

in particular the latter's size and/or insertion position, in a manner dependent on the detection result.

5 5. The system as claimed in one of the preceding claims, characterized in that the insertion means (5) is designed for detecting characteristic points, lines, contours or the like of the person (2) who is performing a movement sequence and is shown in a  
10 recorded video image sequence, or of the person's area shown, and for automatically adapting the marker (6), in particular the latter's size and/or insertion position, in a manner dependent on the detection result.

15 6. The system as claimed in one of the preceding claims, characterized in that the size and/or insertion position and/or movement speed of the marker (6) can be varied manually.

20 7. The system as claimed in one of the preceding claims, characterized in that the insertion means (5) is assigned a storage means in which, for a plurality of different predetermined body movement sequences, the  
25 respective insertion data of at least one marker (6) are stored and can be selected by the user as desired.

8. The system as claimed in one of the preceding claims, characterized in that a point, a line, in  
30 particular in the form of a stylized person or the like can be displayed as the marker (6).

9. The system as claimed in claim 8, characterized in that different display forms which can be chosen by the  
35 user are provided.

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10. The system as claimed in one of the preceding claims, characterized in that the insertion means (5) is integrated in the video camera (1).

AMENDED SHEET

11. The system as claimed in one of claims 1 to 9, characterized in that the insertion means (5) is integrated in the monitor (3).

- 5 12. The system as claimed in one of claims 1 to 9, characterized in that the insertion means (5) is arranged as a separate element within the communications connection between the video camera (1) and the monitor (3).

m-11

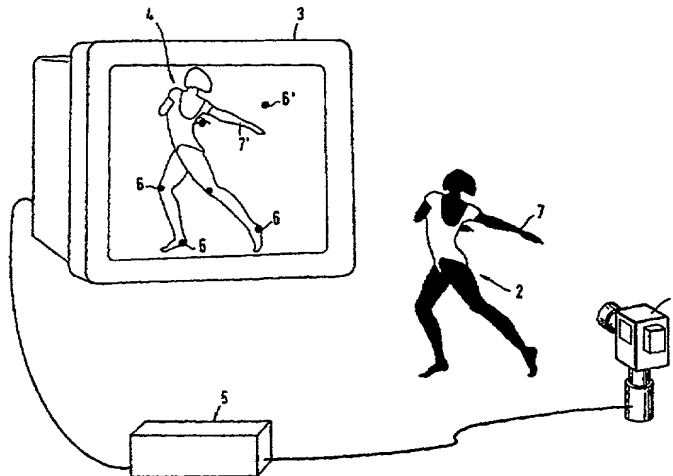


**PCT**  
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Internationales Büro  
INTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE  
INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

(51) Internationale Patentklassifikation <sup>7</sup> : <b>A63B 69/00, 5/11</b>		(11) Internationale Veröffentlichungsnummer: <b>WO 00/12183</b>
<b>A1</b>		(43) Internationales Veröffentlichungsdatum: <b>9. März 2000 (09.03.00)</b>
(21) Internationales Aktenzeichen: <b>PCT/DE99/02567</b>		(81) Bestimmungsstaaten: JP, US, europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
(22) Internationales Anmeldedatum: <b>16. August 1999 (16.08.99)</b>		
(30) Prioritätsdaten: 198 39 638.4      31. August 1998 (31.08.98)      DE		Veröffentlicht <i>Mit internationalem Recherchenbericht. Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist; Veröffentlichung wird wiederholt falls Änderungen eintreffen.</i>
(71) Anmelder (für alle Bestimmungsstaaten ausser US): <b>SIEMENS AKTIENGESELLSCHAFT [DE/DE]; Wittelsbacherplatz 2, D-80333 München (DE).</b>		
(72) Erfinder; und (75) Erfinder/Anmelder (nur für US): <b>DIRKHÖLZER, Thomas [DE/DE]; Sauerheimer Weg 9c, D-91085 Weisendorf (DE); SCHMIDT, Kai-Uwe [DE/DE]; Gebbertstrasse 37, D-91052 Erlangen (DE); WINTER, Patrick [CA/CA]; 69 Summerhill Avenue, Toronto, Ontario M4T 1A9 (CA).</b>		
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(54) Title: **SYSTEM FOR ENABLING A MOVING PERSON TO CONTROL BODY MOVEMENTS TO BE PERFORMED BY SAID PERSON**

(54) Bezeichnung: **SYSTEM ZUR ERMÖGLICHUNG EINER SELBSTKONTROLLE HINSICHTLICH DURCHZUFÜHRENDER KÖRPERBEWEGUNGSABLAUFE DURCH DIE SICH BEWEGENDE PERSON**



(57) Abstract

The invention relates to a system for enabling a moving person to control body movements to be performed by said person. Said system comprises a video camera (1) and a monitor (3) for the output of the recorded video image (4) as well as a means (5) for inserting at least a mark (6) indicating the position to reach during execution of a movement or a predetermined body position in the video image (4).

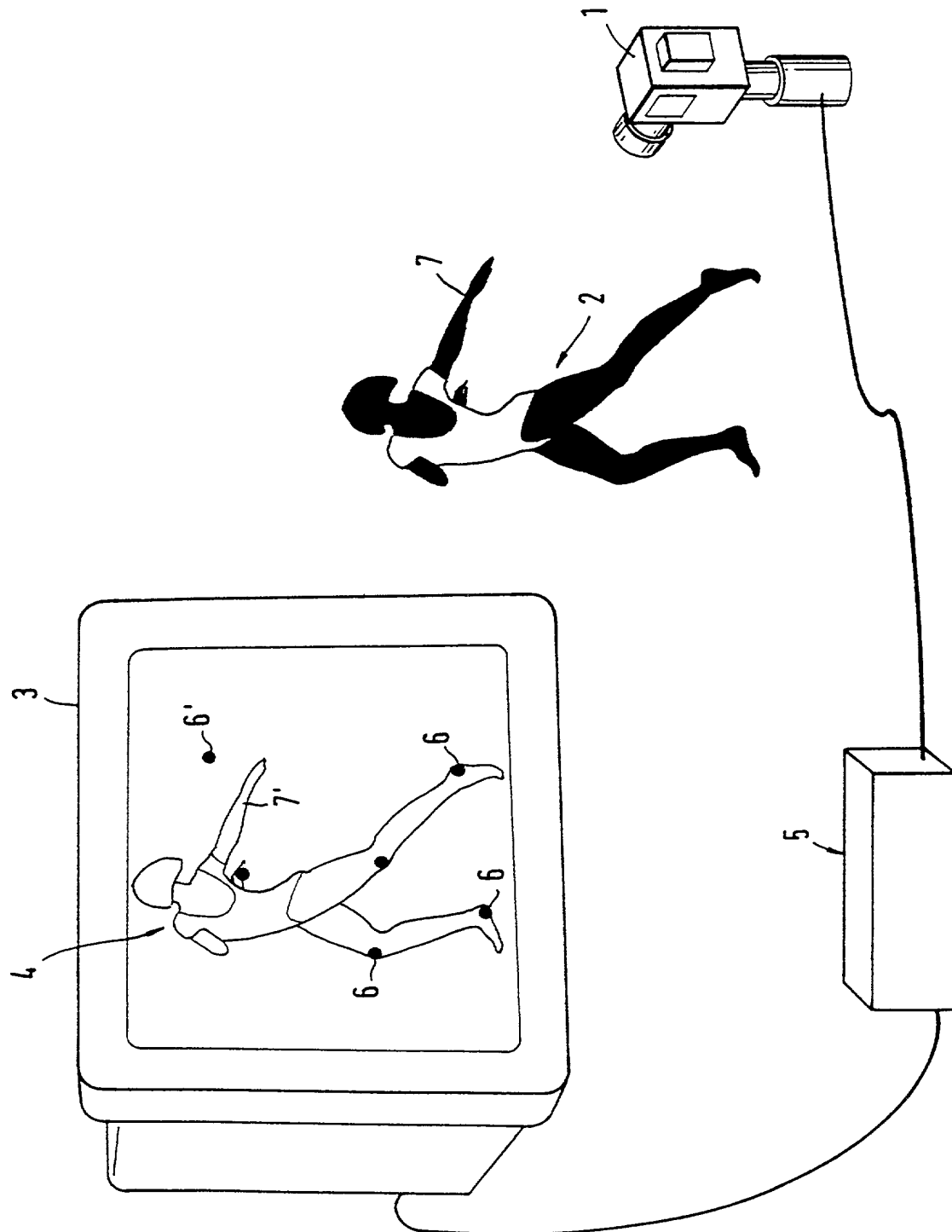


FIG. 1

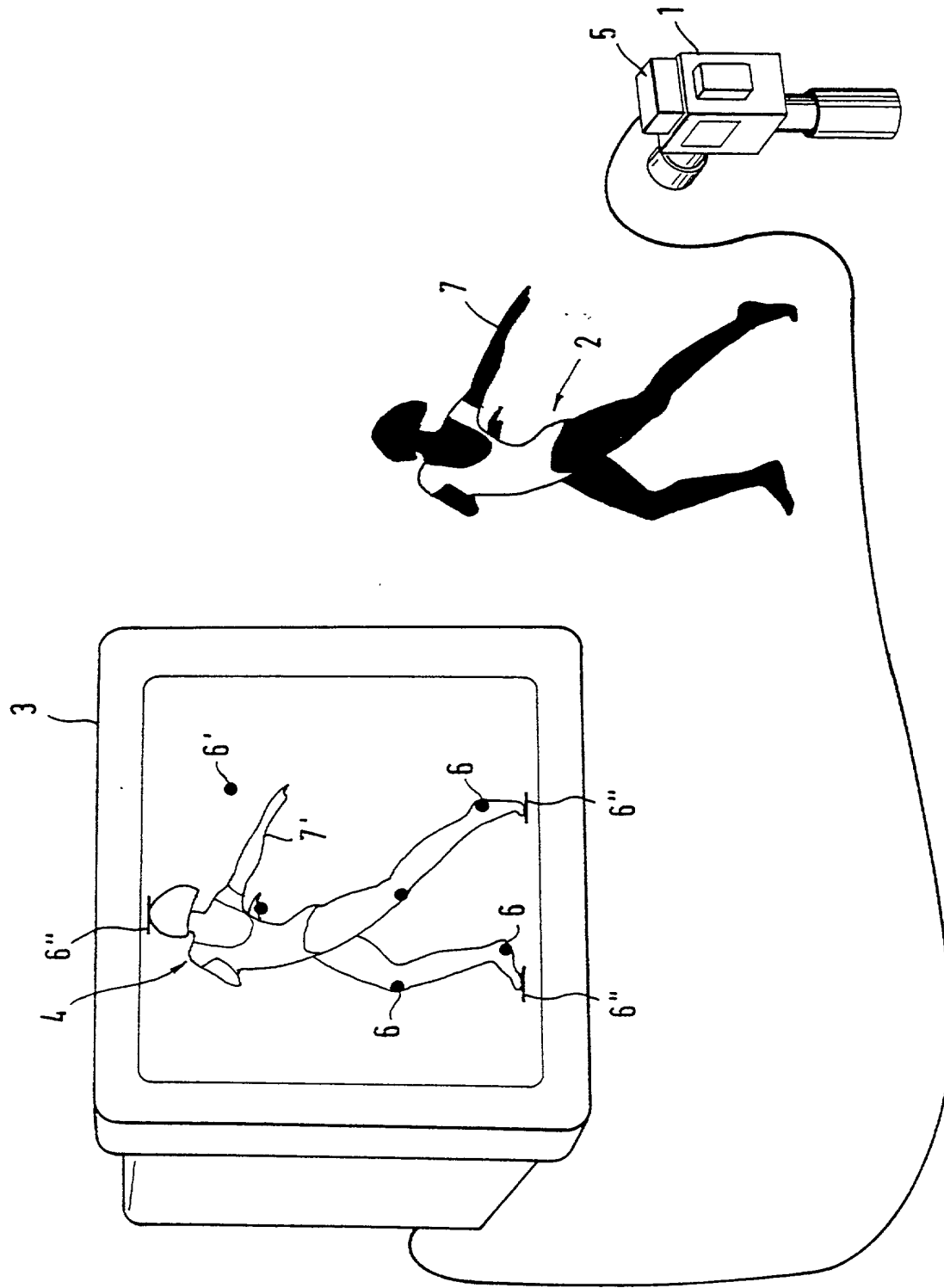


FIG. 2

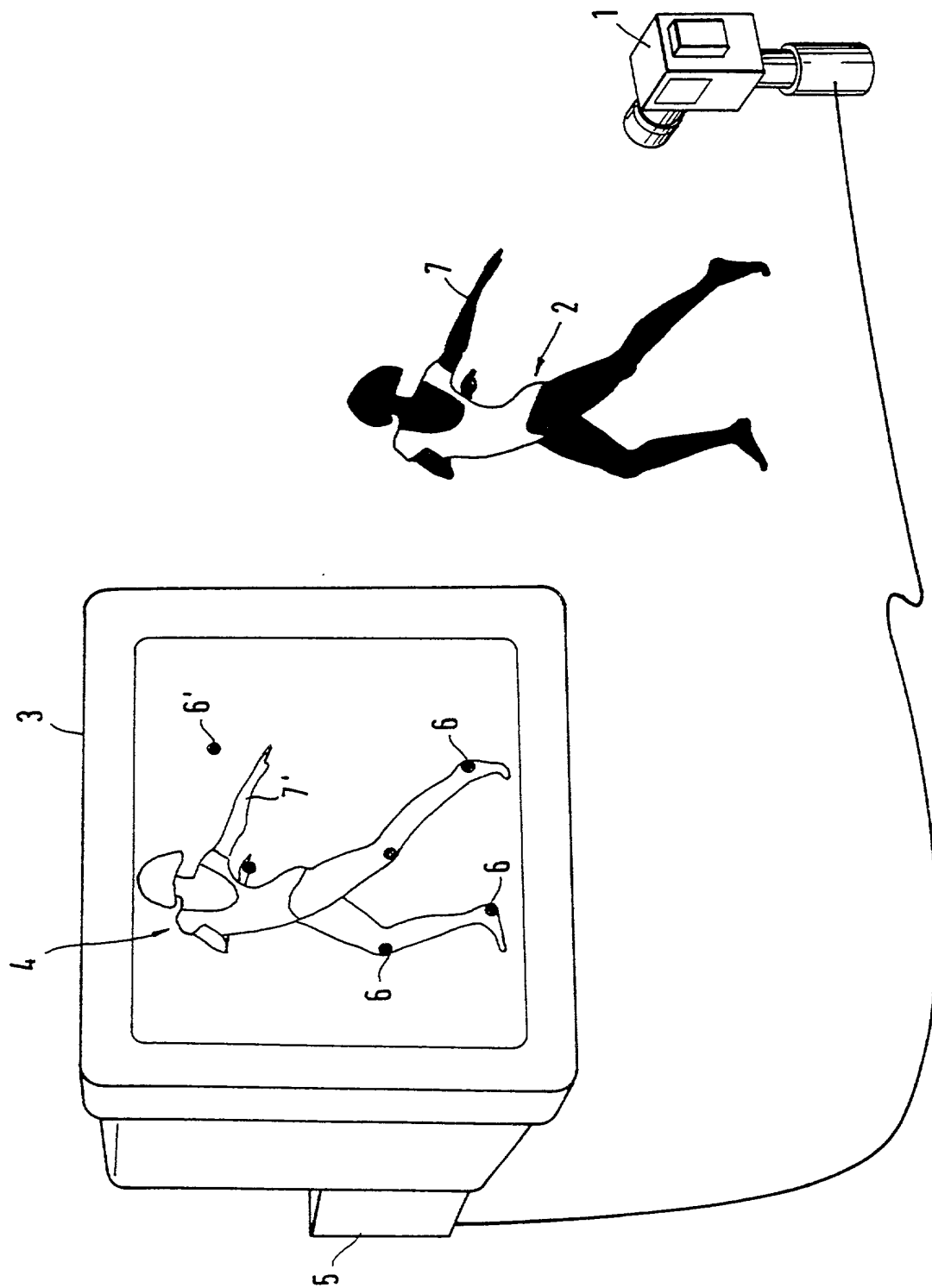


FIG. 3



# Declaration and Power of Attorney For Patent Application

## Erklärung Für Patentanmeldungen Mit Vollmacht

### German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

System zur Ermöglichung einer Selbst-  
kontrolle hinsichtlich durchzuführender  
Körperbewegungsabläufe durch die sich  
bewegende Person

System for enabling a moving person  
to control body movements to be per-  
formed by said person

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)

(check one)

☐ hier beigefügt ist.

☐ is attached hereto.

☒ am 16. August 1999 \_\_\_\_\_ als

☒ was filed on 16<sup>th</sup> August 1999 \_\_\_\_\_ as

PCT internationale Anmeldung:

PCT international application

PCT Anwendungsnummer PCT/DE99/02567

PCT Application No. PCT/DE99/02567

eingereicht wurde und am

and was amended on

abgeändert wurde (falls tatsächlich abgeändert).

(if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obige ☐ Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

# German Language Declaration

Prior foreign applications  
Priorität beansprucht

Priority Claimed

198 39 638.4 DE  
(Number) (Country)  
(Nummer) (Land)

31. August 1998  
(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

☒ ☐  
Yes No  
Ja Nein

(Number) (Country)  
(Nummer) (Land)

(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

☐ ☐  
Yes No  
Ja Nein

(Number) (Country)  
(Nummer) (Land)

(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

☐ ☐  
Yes No  
Ja Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.)  
(Anmeldeseriennummer)

(Filing Date)  
(Anmeldedatum)

(Status)  
(patentiert, anhängig,  
aufgegeben)

(Status)  
(patented, pending,  
abandoned)

(Application Serial No.)  
(Anmeldeseriennummer)

(Filing Date)  
(Anmeldedatum)

(Status)  
(patentiert, anhängig,  
aufgeben)

(Status)  
(patented, pending,  
abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

# German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

And I hereby appoint

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Unterschrift des Erfinders	Datum	Second Inventor's signature	Date
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Staatsangehörigkeit		Citizenship	
Deutsch		German	
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(Supply similar information and signature for third and subsequent joint inventors).

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Unterschrift des Erfinders	Datum <b>3-00</b>	Inventor's signature <i>Patrick Winter</i>	Date <b>Jan. 15, 2001</b>
Wohnsitz <b>Toronto, Kanada</b>		Residence <b>Toronto, Canada</b>	
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<b>CDN-M4T 1A9 Toronto</b>		<b>CDN-M4T 1A9 Toronto</b>	
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Unterschrift des Erfinders	Datum	Inventor's signature	Date
Wohnsitz		Residence	
Staatsangehörigkeit		Citizenship	
Postanschrift		Post Office Address	
Voller Name des fünften Miterfinders (falls zutreffend):		Full name of fifth joint inventor, if any:	
Unterschrift des Erfinders	Datum	Inventor's signature	Date
Wohnsitz		Residence	
Staatsangehörigkeit		Citizenship	
Postanschrift		Post Office Address	
Voller Name des sechsten Miterfinders (falls zutreffend):		Full name of sixth joint inventor, if any:	
Unterschrift des Erfinders	Datum	Inventor's signature	Date
Wohnsitz		Residence	
Staatsangehörigkeit		Citizenship	
Postanschrift		Post Office Address	

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).